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3.2.3 Highway crossings

3.2.3.1 Clearances

A grade separation design must satisfy both vertical clearance and horizontal clear zone requirements.

Vertical clearance distances at grade separation structures depend upon the mainline and side-road highway type and whether an interchange is present. Vertical clearance is measured from the low point of the overhead structure to the roadway, including the traffic lanes and shoulders. Minimum vertical clearance over primary highways is 16.5 feet (5.100 m) and over non-primary highways is 15.0 feet (4.600 m) [OD DM 1C-1]. For all primary over non-primary grade separations with an interchange, it is desirable to provide a clearance of 16.5 feet (5.100 m) [OD DM 6B-2, 1C-1].

Horizontal clear zone distances depend on design speed, average daily traffic (ADT), horizontal curvature and roadside geometry; see the Preferred and Acceptable Clear Zone Tables in the Office of Design's manual [OD DM 8A-2]. Any structure not meeting the preferred clear zone but meeting Office of Design's acceptable clear zone will need Preliminary Section Leader approval and documentation in the file.

Use values in the fill slope portion of the table ($f_s \geq 6:1$). The horizontal clear zone is measured either from the edge of the traveled way in rural sections or from the back of curb in urban sections. Do not determine the clear zone based on the edge of the pavement, as this is typically 2 feet (600 mm) wider than the traveled way. If multiple highway types (mainline, ramps, loops auxiliary lanes, etc.) are present, use the clear zone that governs. Clear zones apply to both the bridge pier and berm slope together when a side pier is proposed. However, clear zone does not apply to the berm slope alone when there will be no side pier and a recoverable berm is proposed.

A vertical clearance of 14.5 feet (4.500 m) should be provided within the horizontal clear zone [OD DM 8A-2]. This vertical clear zone is to be maintained throughout the entire horizontal clear zone area.

3.2.3.2 Ditch drainage

If ditch drainage must be carried through the approach fills of a highway crossing structure, the designer should use a culvert rather than an open ditch, which increases the bridge length and cost. Ditch drainage may be conveyed behind the abutment due to excessive length and/or size of culvert.